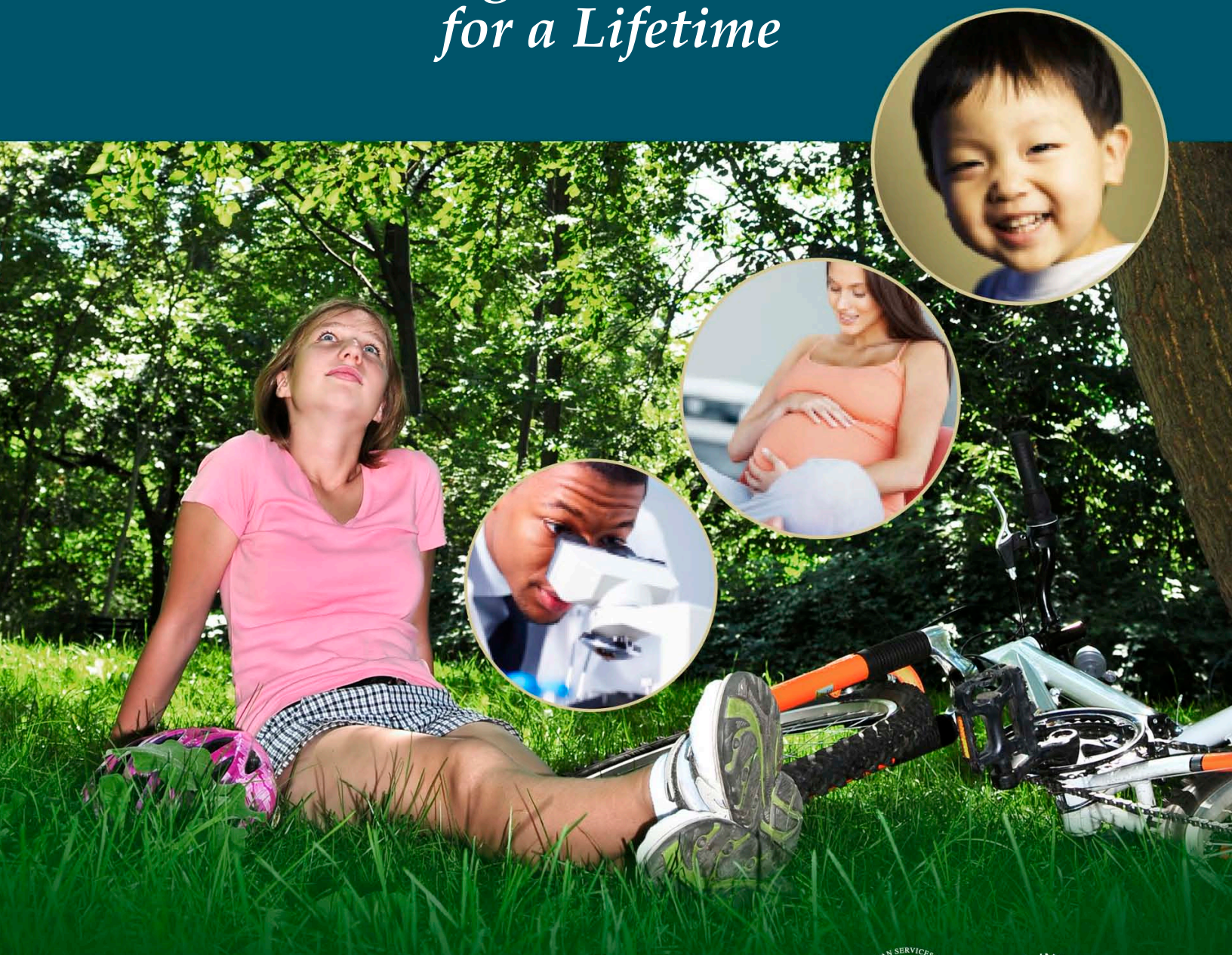
NIEHS
National Institute of Environmental Health Sciences

Centers for Children's Environmental Health and Disease Prevention Research:

Protecting Children's Health for a Lifetime



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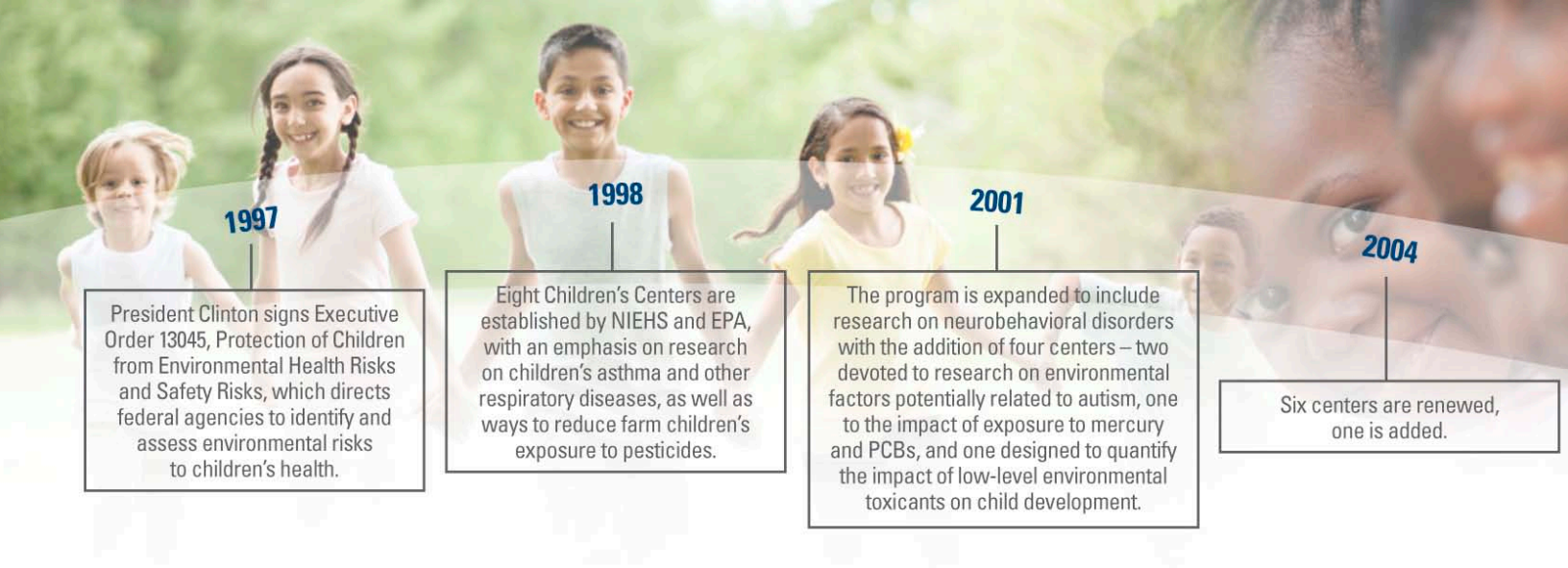

1997

President Clinton signs Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks, which directs federal agencies to identify and assess environmental risks to children's health.

1998

Eight Children's Centers are established by NIEHS and EPA, with an emphasis on research on children's asthma and other respiratory diseases, as well as ways to reduce farm children's exposure to pesticides.

2001

The program is expanded to include research on neurobehavioral disorders with the addition of four centers – two devoted to research on environmental factors potentially related to autism, one to the impact of exposure to mercury and PCBs, and one designed to quantify the impact of low-level environmental toxicants on child development.

2004

Six centers are renewed, one is added.

The mission of the Children's Centers program is to reduce children's health risks from environmental factors. Established in 1998, the program is jointly supported by the National Institute of Environmental Health Sciences (NIEHS) and the U.S. Environmental Protection Agency (EPA).

Introduction

For many reasons, children are likely to be more vulnerable than adults to the effects of environmental contaminants. To better understand the effects of these exposures, the Centers for Children's Environmental Health and Disease Prevention Research (Children's Centers) were established to better understand environmental factors affecting children's health, and to promote translation of basic research findings into intervention and prevention methods to promote the health of children.

Fourteen Children's Centers are currently funded, 12 of which are new in 2010, including six five-year research centers and six three-year grants for smaller formative centers. The program is designed to foster research collaborations among basic, clinical, and behavioral scientists, with participation from local communities.

The Children's Centers is also one of the programs comprising the NIEHS Partnerships in Environmental Public Health, an umbrella program that brings together scientists, community members, educators, health care providers, public health officials, and policy makers in the shared goal of advancing the impact of environmental public health research.

5-year Grants

The larger grants are awarded to research institutions to assemble teams of multidisciplinary scientists from a range of fields to study complex problems during a five-year period. These centers are researching questions about children's exposures to a range of pollutants and compounds and their potential effects on development and learning. Environmental factors in diseases such as asthma, immune disorders, autism, and obesity are also being studied. An additional component of these centers is to administer outreach programs to provide close collaborations with the local community.

3-year Grants

Funded for a three-year period, the formative centers are exploring new and emerging areas of science in children's environmental health while pioneering innovative techniques and approaches. These centers will demonstrate innovative concepts in cutting-edge fields with investigators new to the children's environmental health arena.

Children's Centers Program Goals

- Promote and accelerate translation of basic research findings into applied intervention and prevention methods and strategies.
- Enhance communication, innovation, and research.
- Promote multidisciplinary interactions among basic scientists, clinicians, and behavioral and social scientists.
- Generate data from multiple scientific disciplines to understand the persistent effects of chemicals and other exposures on the fetus and child as they relate to brain and organ system development, growth, and development of the child through young adulthood.

2006

One more center is renewed, one is added.

2007

NIEHS and EPA separately convene independent review panels to evaluate the Children's Centers program. Based upon those evaluations, a workshop, and public input, the agencies elect to solicit applications for new centers to increase flexibility and create a more dynamic network.

2010

The revised Children's Center program funds six research centers and six formative centers. Research at the formative centers includes emerging areas of science in children's health, incorporating innovative approaches.

2011

Today, a total of 14 Children's Centers are supported.

Children's Centers Program Successes

Since the inception of the Children's Centers program, researchers have laid the scientific foundation for a whole new way of thinking about children's health and the environment. The list below includes just a few of the many important Children's Centers' research findings that are improving the lives and health of children today.

- Children's Centers' research has found that people differ in their ability to metabolize pesticides. This finding is of particular concern during pregnancy and early childhood, as children do not appear to fully develop the ability to metabolize some pesticides even up to age 7, putting them at greater risk of adverse health effects.

- Research conducted in Southern California has focused on the health of children living close to major roadways. Studies have shown that exposure to freeway traffic increases the risk for asthma. Also, mothers living near major roadways during pregnancy are more likely to have a child with autism.
- Prenatal exposure to polycyclic aromatic hydrocarbons (PAHs), a component of combustion, such as vehicle exhaust, can lower a child's score on IQ tests, and in one study were found to be related to cognitive delay at age 3.
- Children with autism are more likely than normally developing children to have impairments in mitochondrial activity, which may increase susceptibility to environmental exposures. This finding of dysfunction in mitochondrial energy production could lead to new diagnostic tools for autism and other neurodevelopmental disorders.
- Research shows that mothers who take prenatal vitamins in the first three months before pregnancy or the first month of pregnancy are less likely to have a child with autism.
- Maternal exposure to polybrominated diphenyl ether (PBDE) flame retardants is associated with lower thyroid-stimulating hormone levels during pregnancy, which may have implications for maternal health and fetal development.
- Exposures to environmental chemicals, such as polychlorinated biphenyls (PCBs) and lead, are associated with deficits in many neurobehavioral functions that are also impaired in children with attention deficit hyperactivity disorder (ADHD).
- Children's Centers' research has shown that even very low levels of lead exposure can result in intellectual impairment in children. Studies suggest that there is no discernable threshold for the adverse effects of lead exposure and that many more children than previously estimated are affected.
- Lessons learned by Children's Centers' research in asthma, air pollution, neurodevelopment, community-based participatory research, research methodology, and other areas were published in a series of papers in Environmental Health Perspectives in 2005 designed to support development of a national birth cohort by the National Children's Study.
- The Mount Sinai School of Medicine Children's Environmental Health Center, a previously funded center, is one of three institutions in the United States to be selected to participate in the puberty study sponsored by the transdisciplinary Breast Cancer and the Environment Research Program, which is co-funded by NIEHS and the National Cancer Institute. The Center will work with its existing cohort of 7- and 8-year-old girls in East Harlem to shed light on environmental and genetic determinants of puberty.
- Two Children's Centers are part of the Disease Investigation Through Specialized Clinically Oriented Ventures in Environmental Research (DISCOVER) Program, which has the long range goal of developing new clinical and public health applications to improve disease prevention, diagnosis, and therapy.

Centers for Children's Environmental Health and Disease Prevention Research

Emerging Areas of Research

Today, the NIEHS/EPA Children's Centers are poised to make more contributions to the scientific understanding of complex interactions between the environment, genetics, and other factors, and how those interactions affect our children's health from preconception to young adulthood. Recently, several new and often interconnected areas of scientific inquiry have emerged, including:

- Obesity: What is the role of environmental factors in the epidemic of obesity among our nation's children?
- Endocrine Disrupting Chemicals: How are widespread exposures to chemicals that interfere with the body's endocrine system affecting children, particularly during vulnerable windows of development?
- Epigenetics: How do modifications to DNA resulting from diet, aging, stress, or environmental exposures affect our children or our grandchildren?
- Microbiome: How do helpful microorganisms in the gastrointestinal tract affect children's health? How is the microbiome affected by environmental exposures, including diet, antibiotic use, and chemicals?

NIEHS is committed to protecting the health of children wherever they are – the urban playground, the suburban school, or the rural community. We have the obligation to carefully examine the potential effects of harmful chemicals in the environment at each stage of development, and assess and manage the risks of exposure. Our commitment extends to eliminating disparities in environmental health for minorities, low-income families, and children.

The ultimate goal of the Centers for Children's Environmental Health and Disease Prevention Research is to create a healthy and sustainable environment, for every child, at every stage, in every community, across the nation.

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